

OBSERVATIONS ON THE BEHAVIOUR OF GANGETIC DOLPHINS *PLATANISTA GANGETICA* IN THE UPPER GANGA RIVER¹

SANDEEP K. BEHERA² AND R.J. RAO³

(With one text-figure)

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The Gangetic dolphin (*Platanista gangetica*) occurs in Ganga and Brahmaputra river systems. Due to human activities like poaching and habitat destruction, dolphin populations in many rivers including the Ganga river have been depleted. A study on the ecology of dolphins in the Ganga river, Uttar Pradesh, was carried out during 1993-1995. Various behavioural aspects like feeding, surfacing, social behaviour and habitat utilisation of dolphins were studied through field surveys. These aspects, presented in the paper, are relevant to the conservation and management of dolphins.

INTRODUCTION

The Ganges dolphin (*Platanista gangetica*) is widely distributed in the broad and deep sections of the Ganga-Brahmaputra-Meghna river systems and their major tributaries from the foot of the Himalayas to the tidal zone (Jones 1982). It is found in India, Bangladesh, Nepal and Bhutan (Mohan 1989), but occurrence of dolphin in China is doubtful at present (Perrin and Brownell 1987).

Investigations on the ecology and distribution of the dolphin have been made since the early 1970's (Pilleri 1970, Kasuya and Haque 1972, Haque 1976). In recent years, studies have focused on the status of the dolphin in various rivers and their tributaries (Jones 1982, Pilleri and Tagliavini 1982, Gupta 1986, Shrestha 1986, Singh and Sharma 1985, Rao *et al.* 1988, Choudhury and Hussain 1992). Its habitat preferences in the Indus, Brahmaputra, Chambal and the rivers of Nepal were studied by Kasuya

and Haque (1972), Jones (1982), Singh and Sharma (1985), Perrin and Brownell (1987) and Shrestha (1989, 1990).

Information on behavioural aspects of dolphin is scanty (Pilleri 1970, Kasuya 1972, Schnapp and Adloff 1986). Behaviour of dolphins in the Upper Ganga river has not been studied so far (Murti *et al.* 1991). We carried out a detailed ecological study of the dolphin *Platanista gangetica* during 1993-95 in the Upper Ganga river. Various behavioural aspects of the dolphin, which are important in the conservation management of the species, are presented in this paper.

STUDY AREA

We carried out the study along 645 km in the Ganga river between Rishikesh and Kanpur towns in Uttar Pradesh (Fig. 1). This stretch is shallow, with intermittent small stretches of deep pools and reservoirs upstream of barrages. The bank of the entire river stretch upto Kanpur is sandy and muddy, except between Rishikesh and Haridwar, which has riffle areas with rocky banks.

The climate of the study area is extreme during winter (end November to beginning of March) and summer (March to June). The

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²Present Address: World Wide Fund for Nature, Lodi Road, New Delhi-110003.

³School of Studies in Zoology, Jiwaji University, Gwalior 474 011, M.P.
Email: jaganath@gwr1.dot.net.in

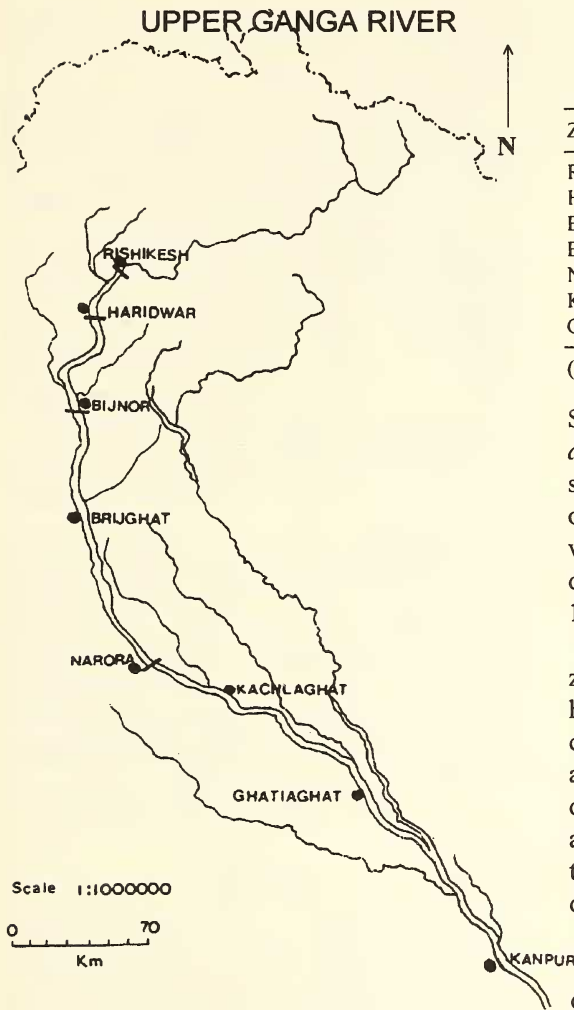


Fig. 1: Map of River Ganga showing the sampling stations

Southwest monsoon arrives in end June and lasts till September.

METHODS

Surveys were carried out regularly by boat and by walking along the riverside to locate dolphins, either through direct sightings or from the information gathered from people including fishermen. The survey method used by Singh and

TABLE I
OCCURRENCE OF DOLPHINS DURING 1993-94 IN DIFFERENT ZONES OF RIVER GANGA: RISHIKESH TO KANPUR TOWNS

Zones	Distance (km.)	Presence
Rishikesh to Haridwar	0-29	Not recorded
Haridwar to Bijnor	29-129	Not recorded
Bijnor to Brijghat	129-213	Present
Brijghat to Narora	213-295	Present
Narora to Kachlaghat	295-362	Not recorded
Kachlaghat to Ghatiaghhat	362-485	Not recorded
Ghatiaghhat to Kanpur	485-645	One sighting

(Rishikesh = 0 km)

Sharma (1985), Rao *et al.* (1988) and Mohan *et al.* (1993) for dolphins was adopted to suit the study area. Intensive ecological study was carried out between Bijnor and Narora Barrage (165 km) where a good dolphin population was identified during a reconnaissance survey in December 1992.

The study area was divided into different zones, considering the hydrological and other habitat characteristics (Table 1). Surveys were conducted every month in each zone on row boats along the middle of the river. Surfacing of dolphins was observed on both sides. In some areas the river was too shallow at midstream for the boat. So one bank of the river was traversed during the upstream survey and the other during the downstream survey. Field survey was conducted between 0600 h and 1800 h for one day for each zone during the first half of a month. In the second half of the month, detailed studies at some identified areas were conducted between 0600 h and 1800 h.

Dolphin sightings were recorded on maps prepared for the present study. The size, colour and behaviour were recorded whenever a dolphin was found. Habitat characteristics such as river width, depth, water temperature and flow were noted at the feeding and breeding grounds. The group size and sex ratio were recorded for each sighting.

The surfacing frequency and diving duration of calves, young and adults were noted

using a stopwatch. After observing them for long periods (1-2 hours), animals were divided into groups according to body size, colour, length of snout, and sex. Feeding behaviour of dolphins was studied by watching them for long periods at the feeding grounds.

RESULTS

Population: Occurrence of dolphins in different zones is shown in Table 1. Of the seven zones surveyed, dolphins were observed in zones 3 and 4. Only one sighting of two young dolphins was recorded in zone 7 at Farrukhabad during September 1993. During 1993-94 and 1994-95, total populations of dolphin in the study area were estimated at 20 and 22 animals, respectively (Table 2). The population of 22 dolphins in 1994-95 comprised of eight calves, four adolescents, six females and four males.

TABLE 2
DOLPHIN POPULATION DURING 1993-94 AND 1994-95 IN RIVER GANGA BETWEEN RISHIKESH AND KANPUR TOWNS

Category	No. of dolphins in 1993-94	No. of dolphins in 1994-95
Males	4	4
Females	6	6
Adolescents	6	4
Calves	4	8
Total population	20	22

BEHAVIOUR

Surfacing: Surfacing of dolphins was observed during different times of the day. Surface jumps were recorded more than 150 times. In this, the beak appears along with the melon of the head, followed by the anterior part of the body. At Brijghat, Puth and Anupshahar, full jumps (the calves jump out completely from the water) were recorded. In the late evenings half jumps of adult dolphins were recorded, where only beaks and melon are exposed. During

summer, side movement of an adult dolphin at a very shallow depth (50-75 cm) was observed 10 km downstream of Brijghat.

Feeding: More feeding was observed during the dry season. At Brijghat an adult dolphin was seen holding a fish measuring 5-7 cm in its beak at 0700 h on February 15, 1994. A similar observation was recorded in the early morning during January, April, and May 1994 at Karnabas. Garhmukteshwar and Puth, respectively. Their feeding on fishes near a fishing net was also seen at Puth on April 20, 1994. In the shallow waters, dolphins chased small fishes and caught them in large quantities. The food of dolphins reported in the literature is taken as a basis to identify the food availability in the study area.

Breeding: Adult sexes were differentiated by the length of the beak. The adult female has a longer beak than the adult male. During April 1993 two adult dolphins (male and female) making surface leaps together 4-5 times (courtship behaviour) were seen at Garhmukteshwar. During May 1994 similar behaviour was noted at Aharghat.

During the study period, ten adult dolphins (four males and six females) were recorded. During the 1993-1994 census, four calves were observed, whereas in the 1994-1995 census, eight calves were recorded. Since one female dolphin gives birth to only one calf per year, the birth of 4 calves in the study area indicated that of the 6 females observed, 4 were participating in the breeding. From the data on the calves, it is apparent that there were atleast four breeding females and 4 adult males in the population. The remaining two females were either non-breeding females or not breeding due to non-availability of a mate. Thus, the sex-ratio of breeding dolphins in the present study is 50:50. The dolphin population density in the study area was estimated at 1 dolphin per 9.1 km. The area has a high carrying capacity and can support more dolphins.

Migration: It was observed that dolphins move to much wider areas during the monsoon

season and retreat to some sections of the river at other times. During monsoon dolphins were distributed throughout the intensive study area i.e. Bijnor to Narora, a stretch of 165 km. When the river is flooded the dolphins get a good cover. Food is also available as fish breed in this season. During the dry season, due to decrease in the water level, dolphins migrate downstream and are concentrated between Brijghat and Narora in a stretch of 80 km. In this stretch, they get adequate water depth due to the release of water from the Kalagarh feeder canal and Bia river into the main Ganges.

Coexistence with other aquatic animals:

The study area had, in addition to dolphins, two species of crocodile, *Gavialis gangeticus* and *Crocodylus palustris*, and twelve species of freshwater turtles. Around fifty species of wetland birds were also recorded at different stretches. Many of these animals are fish eaters and potential competitors for food. Some of the piscivorous birds, especially large groups of cormorants (*Phalacrocorax carbo*) are competitors with dolphin as they also prefer small fishes. River terns (*Sterna aurantia*) were always present where dolphins were feeding.

DISCUSSION

Dolphins exhibit subtle and complex behaviour. They are social animals and live in small to large groups, associated with many animals like crocodiles, turtles and wetland birds. The behaviour of dolphins, particularly marine forms, has been known, both in nature and in captivity. Behaviour of the Ganges dolphin is less studied as its population is very small. Sightings are restricted to occasional glimpses. A significant contribution on dolphin behaviour is that of Pilleri (1970) who studied swimming, diving, blowing, leaping, flight and panic behaviour of *Platanista gangetica*.

The glimpses of surfacing dolphins in selected stretches of the river help in locating and counting them. By regular monitoring of a

river stretch, all the surfacing dolphins can be counted according to the sizes, sexes and groups. This helps to assess the population of dolphins in various rivers.

Pilleri (1970) reported that injured and dead fish are not eaten by dolphins. Due to small beak size and the shape of the teeth, it is apparent that dolphins feed on small fishes only. To get sufficient energy, the animal has to feed on a large quantity of fish, so it always follows the shoals of fish available in shallow zones. The dolphin also chases small fish into shallow waters to catch them easily.

Breeding behaviour is important in the population growth of a species. Pilleri (1971) observed copulatory behaviour of *Platanista gangetica* during April in a tributary of Brahmaputra at a depth of 3 m. According to him, the dolphin pair came out of the water vertically, exposing half of their bodies for several seconds, with their bellies touching, before falling back into the water, to roll over together and lie approximately diagonal to the water line. In the Bijnor-Narora area, dolphins have a gestation period of 10-12 months, and give birth during March-April.

Dolphins do not stay in a particular location permanently, but move from one place to another for food, breeding or in search of proper cover (Jones 1982). The migration of dolphins has been broadly divided by earlier workers into two types; seasonal and local migration (Kasuya and Haque 1972, Jones 1982, Pilleri and Taglivini 1982, Singh and Sharma 1985 and Mohan *et al.* 1993). Pilleri and Taglivini (1982) reported that dolphins of Narayani river in Nepal migrate when the water level of Rapti river rises and is enriched by fishes and crustaceans. Mohan *et al.* (1993) recorded seasonal migration of dolphins in Brahmaputra river. According to them, dolphins ascend upstream during the flood. In Manas, Dikhow, Buridihing and Dansiri rivers they observed similar migration. Downstream movement of dolphins was also recorded by Kasuya and Haque

(1972), and Jones (1982) in the Brahmaputra, Meghna, and the rivers of Nepal.

Local migration of dolphins is a regular phenomenon. The fluctuation of number and group composition of dolphins at a particular area, and disappearance of dolphins from preferred places indicated local migration. It is assumed that such movement of dolphins is in search of food (Sinha 1993), to join other groups for breeding (Singh and Sharma 1985) or to avoid human interference.

Dolphins were observed between Bijnor barrage and Narora barrage. This is the only surviving population in the upper stretch of the Ganga river. According to Ballou (1995), small populations are challenged by a number of factors that increase the likelihood of their extinction. If a population is declining in

number, and no action is taken to reverse the trend, then local extinction is imminent. This is applicable to the dolphins in the present study area. Protection to the small population between Bijnor and Narora barrages has to be given high priority. This will be better achieved if this river stretch is protected as a Dolphin Sanctuary. Necessary measures have to be taken to regulate the fishing activities and also to maintain water quality, to provide a suitable habitat for dolphins.

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